

4.3

Basic Functions

Name _____ Date _____ Period _____

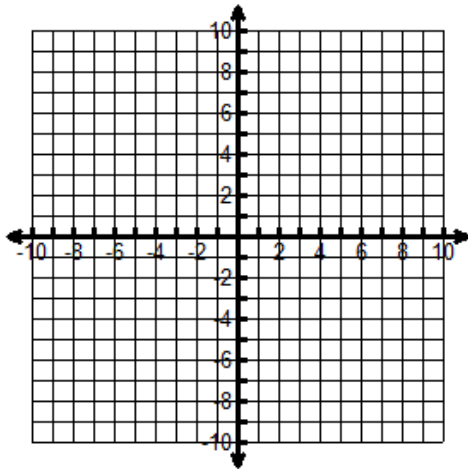
Graph $f(x)$ and each new function without technology on the same graph in different colors and label. Then describe the transformation compared to $f(x)$. Determine if the transformed function is even, odd, or neither. (You should have 4 graphs for each question.)

1. $f(x) = x$

a. $g(x) = -2f(x)$

b. $h(x) = f(x) + 2$

c. $j(x) = f(x - 3)$

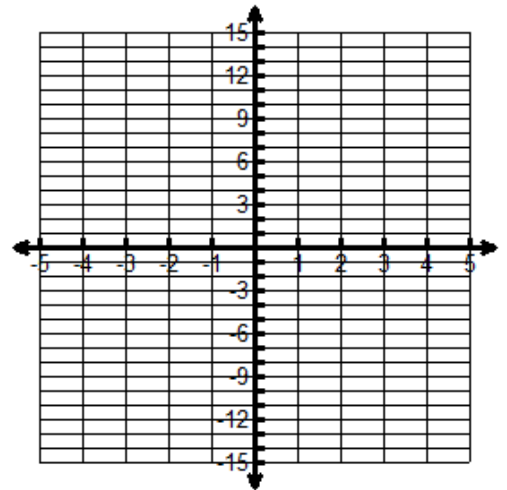


2. $f(x) = x^3$

a. $g(x) = -f(x)$

b. $h(x) = 3f(x) - 2$

c. $j(x) = f(x + 2)$

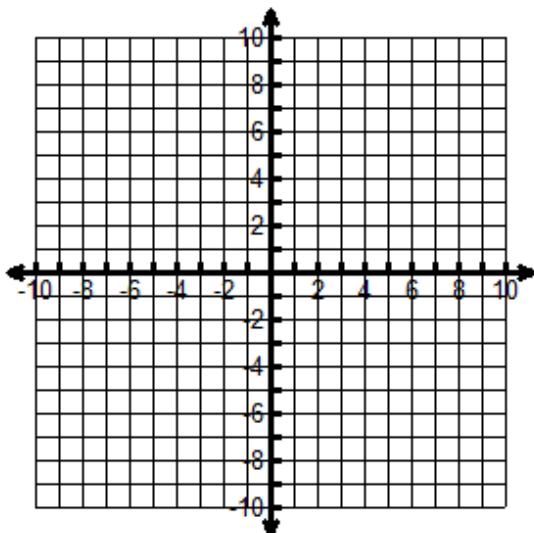


3. $f(x) = |x|$

a. $g(x) = 3f(x)$

b. $h(x) = f(x - 1) + 4$

c. $j(x) = 2f(x - 3) + 5$

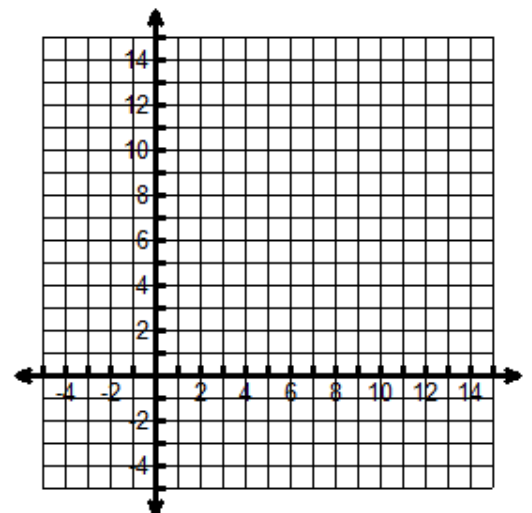


4. $f(x) = \sqrt{x}$

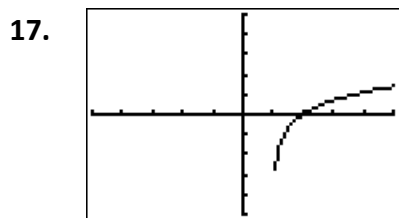
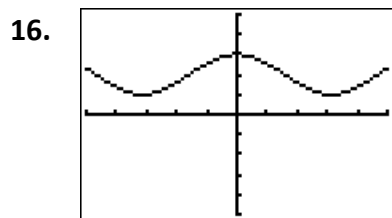
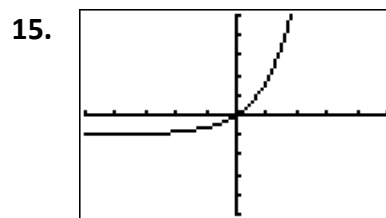
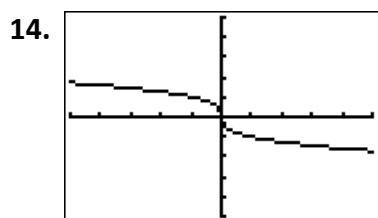
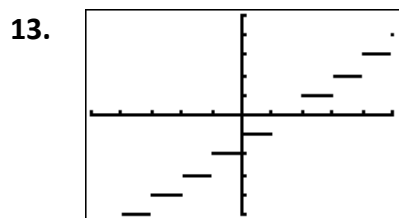
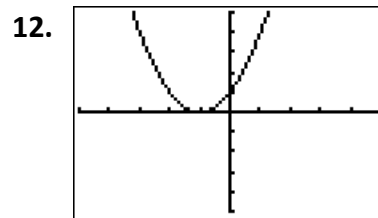
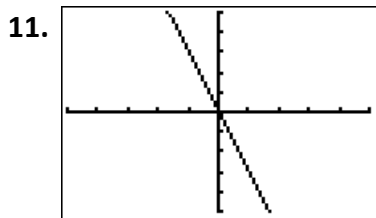
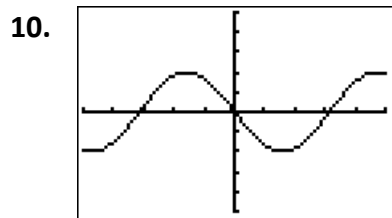
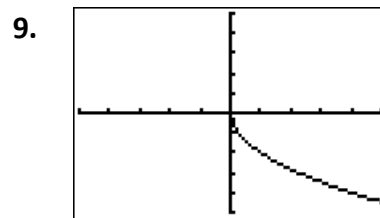
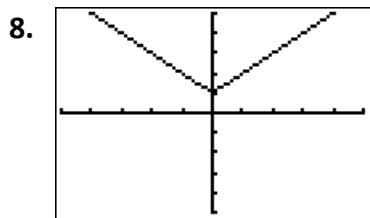
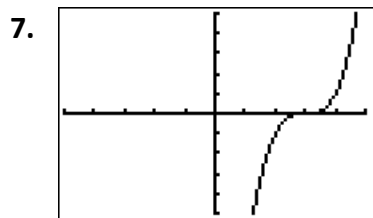
a. $g(x) = f(x + 1) - 3$

b. $h(x) = f(x) - 2$

c. $j(x) = 4f(x) + 1$



Each graph is a slight variation on the graph of one of the basic functions. Match the graph to one of the given functions $a - k$. All graphs are shown in the window $[-5, 5]$ $[-5, 5]$.



- $a) y = -2 \sin x$ $b) y = \cos x + 2$ $c) y = e^x - 1$ $d) y = (x - 3)^3$
 $e) y = (x + 1)^2$ $f) y = |x| + 1$ $g) y = -3x$ $h) y = -2\sqrt{x}$
 $i) y = \text{int}(x - 1)$ $j) y = -\sqrt[3]{x}$ $k) y = \ln(x - 1)$

Use the graphs from 7-17 and identify which of the graphs fit the description given.

18. The two functions whose domain consists of all nonnegative real numbers.

19. The function whose range is $[1, 3]$.

20. The five functions that have an x-intercept at zero.

21. The three functions that have a domain and range of all real numbers.

22. The four functions that are increasing on their entire domain.

23. The two functions with no zeros.

Use your graphing calculator to produce a graph of the function. Find the domain & range of the function by looking at the graph.

24. $f(x) = x^2 - 3$

25. $f(x) = \ln(x + 2)$

26. $f(x) = |x + 1|$

27. $f(x) = 2\sqrt[3]{x}$

For each of the following functions determine a) the interval on which the function is increasing and/or decreasing, b) if there are any extrema, if so name the point and tell whether it is a local maximum or minimum, and c) state how the function is related to the basic function.

28. $f(x) = \sqrt{x-6}$

29. $f(x) = -\sin(x) + 2$

30. $f(x) = e^x - 1$

31. $f(x) = |x| - 4$

32. $f(x) = 3\cos(x)$

33. $f(x) = x^3 + 3$